# A Comparative Study of Bio-Organic Fertilization on some Barley Cultivars

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## ABSTRACT

Two field experiments were carried out for two successive seasons (2008/2009 and 2009/2010) in the experimental farm of the faculty of Agriculture (Saba Basha) Alexandria University to study the effect of bio-organic fertilization sources (untreated, organic, microbein, cerealine, mycorrhizae) on three cultivars (Giza123, Aksad and Oroar-Ash). A Split plot design with three replications was used in this study. The obtained results could be summarized as follows:

- Significant differences were noticed among the three barley cultivars in both seasons, where Aksad cultivar followed by Giza123 out yielded Oroar-Ash cultivar in grain and straw yields/fed., and all of their attributes.
- Allbio-organic fertilizers treatments significantly increased grain yield, yield components, and its quality traits. Meanwhile, Mycorrhizae inoculation gave the highest straw and grain yields/fed.

## INTRODUCTION

Barley *(Hordeum vulgare, L.)* is considered one of the most important cereal crops in world after wheat, maize and rice (Czmebor and Czembor, 2002). While in Libya, it is the second most important cereal crop following wheat (Al-Idrissi, et al., 1996). The cultivated area of barley is increasing yearly to produce high yield of barley to meet the increasing needs for animal feed and many other uses.

A great variability in yield attributes and yield potentiality among Egyptian and Libyan barley cultivars in clay loam soil was reported by (El-Sayed et al., 1996, El-Bawab, 1999, Abdel Hamed and Mohamed, 2000, Abdel Hamed et al., 2001). Significant differences among five barley cultivars were reported by Khater (2002).

There is a growing need on a global scale, to reduce the dependence of Agriculture on commercial sources of nitrogen which are expensive and considered as the most pollutant for Agro ecosystem. Therefore, intensive efforts were devoted to increase the efficiency of biological $N_2$ fixation, not only though legume-Rhizobium associations, but also, through the non-symbiotic $N_2$-fixation. Recently, several investigators have successfully used bio-organic from bacterial origin to reduce of barley to organic – bio fertilizers.

Several authors reported significant increase in yield of barley (El-Bawab, 1990, Zeidan et al., 1994, Abdel Hamid and Mohamed, 2000, and Salem et al., 2000). Salib et al. (2002) noticed that inoculating barley grains with cerealine combined with 7.5 $m^2$ FYM was the best treatment regarding grain and straw yields/fed.

Therefore, the present study aimed to investigate the comparative study of bio-organic fertilization on some barley cultivars for some growth, yield and its components traits.

## MATERIAL AND METHODS

Field experiment have been conducted in the experimental farm of the Faculty of Agriculture (Saba Basha) Alexandria University during 2008/2009 and 2009/2010 winter seasons to compare between the effect of Bio and Organic fertilizations on some barley cultivars.

Analysis of chemical and physical properties of the experimental soil (0 to 30 cm) is shown in table (1). The determination of soil physical and chemical analysis was carried out according to the method reported by Page et al. (1982).

The experimental design was split plot with three replicates. Three barley cultivars (Giza123, Aksad and Oroar-Asha) were used and randomly distributed in the main plots, while organic bio-fertilization treatments were randomly distributed to the sub-plots as follows:

1- Without inoculation (control).

2- Organic manure (cheep manure) used in the present study was achieved at the rate of 8 ton/fed (table 2).

3- Inoculation with Microbein. An inoculant for all crops used in Egypt, containing nitrogen fixing bacteria Azospirillum barislense and Bacillus megertherium.

4- Inoculation with Cearelin. An inoculant for all crops containing nitrogen fixing bacteria Azotobacter Chroococcum and Azospirillum barislense.

These bio-fertilizers are produced by the general organization for Agriculture Equalization, Ministry of Agriculture and land Reclamation, Egypt (Abou El-Naga, 1993).

The inoculation with Microbein or Cerealin was performed by coating barley grains with each individually using a sticking substance (Arabic gum 5% just before sowing).

**Table (1)** Some physical and chemical properties of the experimental soil (average of two seasons)

| Particle size distribution (%) | | | Soil texture | pH | EC ds/m | Total $CO_3$- % | Total N (%) | Available P mg/Kg soil | Organic matter (%) |
|---|---|---|---|---|---|---|---|---|---|
| Sand | Silt | Clay | | | | | | | |
| 13.1 | 43.4 | 43.5 | clayloam | 8.0 | 4.53 | 7.27 | 0.09 | 3.80 | 1.38 |

| Soluble cations (meq/l) | | | | Soluble anions (meq/l) | | |
|---|---|---|---|---|---|---|
| $Ca^{2+}$ | $Mg^{2+}$ | $Na^{+}$ | $K^{+}$ | $HCO_3^{-}$ | $Cl^{-}$ | $SO_4^{-2}$ |
| 18.15 | 10.40 | 15.10 | 1.40 | 2.43 | 26.15 | 14.45 |

**Table (2)**: Composition of sheep manure

| Determination | Moisture % | O. M. % | Total N % | Total P % | Total K % | pH |
|---|---|---|---|---|---|---|
| Sheep manure | 64.6 | 27 | 1.4 | 0.60 | 1.00 | 5.4 |

5) Inoculation with A-mycorrhizal fungi (Glomus macracarpum) strain from plant production Dept., Fac. of Agric. (Saba Basha) at a rate of 100 ml infected roots and was mixed with the soil.
6) Mixed inoculation with organic manure plus microbein.
7) Mixed inoculation with organic manure plus cerealin.
8) Mixed inoculation with organic manure plus mycorhizae fungi.

Each sub-plot in the experiment was 3.5 m long and 3 m wide (10.5 $m^2$) i.e. 1/400 feddan) and 20 cm apart. Nitrogen fertilizer was applied before irrigation after sowing plants. Phosphorus fertilizer was applied before planting as superphosphate (15.5% $P_2O_5$) at a rate of 50 kg $P_2O_5$/fed. Seeds were planted at a rate of 40 kg/fed seeds /$m^2$ for Giza123, Aksad and Oroar-Asha, respectively. Sowing date occurred on the 4 December in both seasons. In the first and second seasons were preceded by maize (*Zea mays, l.)* in the experiment. The main cultural practices were carried out as recommended by for barley production.

The studied characters could be grouped and presented as follows.

A- Growth attributes:

Representative samples from ½ $m^2$ were taken from each plot at age of 60, 75 and 90 days after sowing (DAS) to estimate the following traits:

1) Dry matter accumulation (g/$m^2$)

2) Crop growth rate (CGR) was calculated according to the formula suggested by brown (1984).
$CGR = (W_2 - W_1) / (T_2 - T_1)$ $g/m^2/week$.

3) Relative growth rate (RGR) was calculated according to the formula suggested by Brown (1984).
$RGR = (\text{Log } W_2 - \text{Log } W_1) / (T_2 - T_1)$ g/g/week

4) Total chlorophyll.
At harvest, the agronomic characteristics, length, number of spike/m2, number of grains/spike, 1000-grain weight, straw and grain yields/fed.

Also, Barely plant samples were collected from all treatments- Fresh plant samples (grain) were washed by tap water followed by distilled water and dried in an oven at 70 °C for 48 hrs. The grains were finely ground and stored for chemical analysis. The grain was wet digested, using a mixture of $H_2SO_4$ $H_2O_2$ (Lowther, 1980) and the following determination.

The grain crude protein was determined using the Kyeldahal method according to A.O.C.A (1980) where the protein content was calculated using 6.25 as a conversion factor.

All the obtained data were statistically analyzed according to procedures described by Gomez and Gomez (1984).

## RESULTS AND DISCUSSION

### A) Growth attributes:

### 1- Dry matter accumulation ($g/m^2$)

Table (3) indicates significant differences among the three cultivars for this trait; Giza123 had greater values than other barely cultivars.
Concerning the effect of bio-organic fertilizers, the results in table (3) show significant differences among them. The highest dry matter were obtained from bio-organic fertilizer treatment, whereas, control treatment gave the lowest one at different samples in both seasons.
The interaction between cultivars x bio-organic fertilization was insignificant in both seasons.

### 2- Leaf area Index (LAI)

In both seasons, the analysis of variance showed that Oroar-Asha cultivar was the highest leaf area index than other cultivars at the first sample in 2008/2009 and two samples in 2009/2010 seasons (Table 4).

Data in Table (4) showed that leaf area index for the three cultivars were delayed due to inoculation with Mycorrhizal fungi at the second growth stage in the two seasons.

## 3- Crop growth rate (CGR)

In both season, the results in Table (5) showed significant differences at two growth intervals in the first season and the first growth interval in the second season. Aksad cultivar gave the highest values of crop growth rate than other cultivars.

Regarding bio-organic fertilizers, the data showed highly significant differences in crop growth rate. Microbein and organic manure gave the highest crop growth rate at two growth interval in the first reason. It could be concluded that effect of fixed nitrogen during the growth stages of barley plants. These results are similar with those obtained by Zeidan et al. (1994) and Ahmed (2004).

The interactions among cultivars and bio-organic fertilizers were insignificant in both reasons.

## 4- Relative growth rate (RGR)

Data pertaining to varietal differences and the effect of barley cultivars and bio-organic fertilizers on relative growth rate are presented in Table (6)

Highly significant differences were existed among barley cultivars at first interval of growth in 2008/2009 season. Aksad and Oroar-Asha cultivars gave the highest relative growth rate as compared with Giza123 cultivar. Similar results were reported by El-Bawab (1999), and Ahmed (2004).

Concerning the effect of bio-organic fertilizers, the results on Table (6) show significant differences among them. The highest relative growth rate was from Microbein and organic manure, where control treatment gave the lowest one at the first interval growth in the first season only.

The interaction among cultivars and bio-organic fertilizer was insignificant at two interval growth in both seasons.

## 5- Total chlorophyll content

Data in Table (7) showed that significant difference between among cultivars for this trait at all samples in both seasons. Giza123 cultivar gave the highest total content chlorophyll followed by Aksad cultivar as compared with Oroar-Asha chlorophyll. Similar results were reported by El-Hag (2001), Mowafy (2002) and Abu-Grab (2006).

Regarding bioorganic fertilizers, the data showed highly significant differences in total chlorophyll content as compared with control (untreated) gave the lowest one (Table 7).

## B) Yield and its components

Table (8) shows the results of plant height, spike length, number of grains/spike, number of spike/$m^2$, 1000-grain weight, straw yield and grain yield.

### 1- Plant height and harvest time

In both seasons the analysis of variance showed that Oroar-Asha cultivar was taller than Aksad cultivar. However, the tall of two cultivars Giza123 and Oroar-Asha were not differed in this respect in both seasons (Table 8).

Concerning bio-organic fertilizers, the results revealed highly significant effect. In general, Organic manure and Cerealin gave the tallest plants in the first season. The increase of plant height may be attributed to more absorption of nutrient which reflects growth activity, nitrogenous compared assimilation forming more growth substances, more cell divisions and enlargement more forming of tissues and organ and plant elongation. These finding are in harmony with Fayez (1990), Mehaseni (1999), and El-Kalla (2002).

The interaction between cultivars and bio-organic bio-fertilizers was not significant on this character.

### 2- Spike length

The results in Table (8) showed significant differences in spike length between the among cultivars, where, Aksad cultivars gave longer spike length than other cultivars in the first season only.

Regarding bio-organic fertilizers, the data showed highly significant differences in spike length as compared with control, which gave the shortest spikes (Table 8). The mode of action of bio-organic fertilizers may be due to its exertion on some growth regulators which promote cell division and elongation and resulted in longer spike.

These results are in harmony with those of Hamed (1998), El-Kella et al. (2002), Abdel-Maksoud and Abdalla(2003) and Farag (2003).

Also, the interaction of barely cultivars and bio-organic fertilizers was not significant in the two seasons.

### 3- Number of grains/spike

Data in Table (8) showed that significant differences among cultivars for this trait in both seasons. Giza123 and Aksad barely cultivars gave the highest number of spike as compared with Oroar-Asha cultivar in the first season only.

Applying bio-organic fertilizers significant resulted in increasing in number of grains/spike. Mycorrizae inoculation gave the highest number of grains/spike compared with the control treatment in the first season. This may be due to an increase in plant photosynthesis accumulation and plant photosynthesis rate, which led to an increase in plant growth and development. These results are in agreement with those of Said (1998) and El-Kalla et al. (2002).

The interaction among cultivars and bio-organic fertilizers had insignificant effect on this trait in both seasons.

### 4- Number of Spikes/$m^2$

Giza123 cultivar recorded significantly larger number of spikes/$m^2$ (435.64 and 376.83 spikes/$m^2$) in both seasons. These significant differences may be due to the genetic differences among the three cultivars. These data are in harmony with those reported by Abdel Hamid and Mohamed (2000) and Abdel-Hamid et al. (2001).

Addition of bio-organic fertilizers was effective to increase significantly of the number of spike/$m^2$ compared with the check (control) treatment in the first seasons only. Similar results are obtained by Hamed (1998) and Abdel- Hamid and Mahamed (2000).

The interaction effect between among cultivars and bio-organic fertilizers was significant. Data in table (9) showed the highest no. of spikes/$m^2$ was obtained by Giza123 with organic mycorrhizal inoculation.

### 5- 1000-grain weight (g)

Results showed significant differences among cultivars (Table 9) were Giza123 gave heavier grain than Oroar-Asha cultivar. The over mean values were 55.33, 52.10 and 50.40 gm in 2008/2009 season for Giza123, Aksad and Oroar-Asha cultivar. These results are in harmony with those of El-Kalla (2002) and Ahmed (2004).

Concerning bio-organic fertilizers, results showed significant effect on 1000-grain weight, where sheep manure, mycorrhizae and organic +Microbein gave the heaviest grain weight, may be due to the role of nitrogen in promoting phytohormone formation and translocation to the

plant that increased grain weight. These results agreed with these of Mehasen (1999) and El-Kalla (2002).

The interaction effect between cultivars and bio-organic fertilizers were significant. Data in Table (9) showed that Giza123 cultivar gave the highest 1000-grain weight with organic plus microbein fertilizer in the first season only.

## 6- Straw yield (t/fed)

The results of analysis of variance indicated significant differences in straw yield/fed among barely cultivars. The superiority by Aksad cultivar in straw yield/fed in the second season only. This may be attributed to the differences among the studied characteristics i.e. plant height, and dry matter accumulation. Several investigations e.g. El-Hag (2001) and Ahmed (2004).

Regarding bio-organic fertilizers, the data showed significant increases in straw yield/fed, where, Mycorrhizae fungi gave the highest straw yield, while the control produced the lowest one in the second season. The increase in straw yield due to bio-organic fertilizer may be attributed to their effect on growth parameters i.e. plant height and number of spikes/$m^2$. These results are in harmony with those of Hamid (1998), Megahed and Mohammed (2001), El-Kalla (2002) and Ahmed (2004).
The interaction between cultivars and bio-organic fertilizers was insignificant in both seasons.

## 7- Grain yield (ardab/fed)

In both seasons, the results in Table (9) showed significant differences in grain yield/fed among the three cultivars. The superiority of Aksad cultivar in grain yield. Such finding could be attributed to yield components Viz., No. of spikes/$m^2$ 1000-grain weight, and characteristics of each variety. These results are in harmony with those of El Hag (2001), El-Kalla (2002), and Ahmed (2004).

Regarding bio-organic fertilizers, the data showed significant increases in grain yield in both seasons, where, Mycorrhizae inoculation gave the highest grain yield/fed. This increases due to biofertilizers may be attributed to their effect on growth parameters i.e. plant height and no. of spikes/$m^2$. These results are in harmony with those of Ahmed (1998), Megahed and Mohamed (2001), El-Kalla (2002), Farag (2003) and Ahmed (2004).

The interaction between cultivars and bio-organic fertilizer was not significant in the two seasons.

### C-Grain Quality

### Crude protein %

The results of analysis of variance indicated insignificant differences in crude protein among Giza123, Aksad and Oroar-Asha in both seasons (Table 9).

Regarding bio-organic fertilizers, the data showed significant increases in grain protein where, Cerealin gave the highest percentage, while the control produce the lowest one in the second season only. These results are in harmony with those of El-Kalla (2002), Farag (2003) and Ahmed (2004).

The interaction among cultivars and bio-organic fertilizers had significant effect on this trait in both seasons.

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**Table: (3) Dry matter Accumulation (g/m$^2$) as affected by three cultivars and bio-organic fertilizers at three growth stages in 2008/2009 and 2009/2010 season.**

| Treatments | 2008/2009 season | | | 2009/2010 season | | |
|---|---|---|---|---|---|---|
| | 60 DAS | 75 DAS | 90 DAS | 60 DAS | 75 DAS | 90 DAS |
| **A) Cultivars** | | | | | | |
| **Giza 123** | 238.97 a | 279.00 a | 323.00 a | 290.13 a | 282.39 a | 328.66 a |
| **Aksad** | 153.72 b | 226.09 b | 272.68 b | 234.48 b | 252.88 b | 283.76 b |
| **Oroar- Asha** | 172.24 b | 209.57 b | 232.74 c | 214.75 b | 244.15 b | 272.50 b |
| **L.S.D 0.05** | 35.10 | 30.70 | 33.20 | 42.23 | 30.85 | 38.00 |
| **B) Org- biofertlize** | | | | | | |
| **Untreated** | 191.56 abc | 241.00 | 260.04 b | 214.25 c | 234.96 b | 392.84 a |
| **Organic** | 205.58 ab | 234.64 | 297.49 ab | 365.08 ab | 261.80 ab | 305.64 ab |
| **Microbin** | 183.33 abc | 369.09 | 319.18 a | 257.99 abc | 285.40 a | 2340.33 a |
| **Cerealine** | 175.58 bc | 234.64 | 286.00 b | 226.44 bc | 248.13 ab | 280.90 ab |
| **Mycorrhizae** | 214.73 a | 249.58 | 276.28 ab | 245.74 abc | 286.87 a | 297.87 ab |
| **Org. + Microbin** | 191.60 abc | 240.49 | 285.2 ab | 272.59 a | 272.02 ab | 300.76 ab |
| **Org. + Cerealine** | 184.67 abc | 229.16 | 265.33 ab | 241.51 abc | 244.91 b | 279.24 ab |
| **Org. + Mycorrhizae** | 159.42 c | 207.78 | 252.25 b | 247.99 abc | 244.36 b | 251.96 b |
| **L.S.D 0.05** | 29.99 | ns | 50.14 | 39.64 | 36.21 | 62.17 |
| **Interaction** | | | | | | |
| **A × B** | ns | ns | ns | ns | ns | ns |

**Table: (4) Leaf area Index (LAI) as affected by some barley cultivars and bio-organic fertilizers at different growth stages in 2008/2009 and 2009/2010 seasons.**

| Treatments | 2008/2009 season | | 2009/2010 season | |
|---|---|---|---|---|
| | 75 DAS | 90 DAS | 75 DAS | 90 DAS |
| **A) Cultivars** | | | | |
| **Giza 123** | 3.42 | 4.43 a | 3.21 b | 4.11 b |
| **Aksad** | 3.48 | 3.94 b | 3.25 b | 3.86 b |
| **Oroar- Asha** | 3.94 | 4.49 a | 3.89 a | 3.63 a |
| **L.S.D 0.05** | ns | 0.44 | 0.60 | 0.46 |
| **B) Org- biofertlize** | | | | |
| **Untreated** | 3.46 | 4.23 ab | 3.36 | 3.96 b |
| **Organic** | 3.76 | 4.38 ab | 3.57 | 4.31 ab |
| **Microbin** | 3.78 | 4.42 ab | 3.73 | 4.20 ab |
| **Cerealine** | 3.56 | 4.32 ab | 3.44 | 4.28 ab |
| **Mycorrhizae** | 3.71 | 4.58 a | 3.40 | 4.74 a |
| **Org. + Microbin** | 3.71 | 3.89 b | 3.32 | 3.89 b |
| **Org. + Cerealine** | 3.64 | 4.55 a | 3.65 | 4.27 ab |
| **Org. + Mycorrhizae** | 3.27 | 4.03 b | 3.14 | 3.93 b |
| **L.S.D 0.05** | ns | 0.45 | ns | 0.47 |
| **Interaction** | | | | |
| **A × B** | ns | ns | ns | ns |

**Table: (5) Crop growth rate (gm/m$^2$/week) as affected by three cultivars and bio-organic fertilizers at two periods in 2008/2009 and 2009/2010 seasons.**

| Treatments | 2008/2009 season | | 2009/2010 season | |
|---|---|---|---|---|
| | 65 - 75 DAS | 75 -90 DAS | 65 -75 DAS | 75 -90 DAS |
| **A) Cultivars** | | | | |
| **Giza 123** | 2.67 b | 2.88 b | 0.53 b | 3.09 |
| **Aksad** | 4.71 a | 3.40 a | 1.96 a | 2.05 |
| **Oroar- Asha** | 3.92 ab | 1.38 c | 1.23 a | 1.89 |
| **L.S.D 0.05** | 1.70 | 1.4 | 0.70 | ns |
| **B) Org- biofertlize** | | | | |
| **Untreated** | 2.22 ab | 1.98 b | 1.34 | 10.53 |
| **Organic** | 3.30 ab | 4.19 a | 0.22 | 2.93 |
| **Microbin** | 5.76 a | 3.55 ab | 1.83 | 3.66 |
| **Cerealine** | 3.85 ab | 2.25 ab | 145 | 3.18 |
| **Mycorrhizae** | 3.33 ab | 1.78 ab | 2.74 | 0.73 |
| **Org. + Microbin** | 3.63 ab | 2.98 ab | 0.04 | 1.92 |
| **Org. + Cerealine** | 3.64 ab | 2.38 ab | 0.23 | 2.29 |
| **Org. + Mycorrhizae** | 4.41 ab | 2.97 ab | 0.24 | 0.51 |
| **L.S.D 0.05** | 2.22 | 2.18 | ns | ns |
| **Interaction** | | | | |
| **A x B** | ns | ns | ns | ns |

**Table: (6) Relative growth rate (g/g/week) as affected by three cultivars and bio-organic fertilizers at two growth periods in 2008/2009 and 2009/2010 seasons.**

| Treatments | 2008/2009 season | | 2009/2010 season | |
|---|---|---|---|---|
| | 65 - 75 DAS | 75 -90 DAS | 65 -75 DAS | 75 -90 DAS |
| **A) Cultivars** | | | | |
| **Giza 123** | 0.05 b | 0.005 | 0.001 | 0.005 |
| **Aksad** | 0.012 a | 0.008 | 0.002 | 0.003 |
| **Oroar- Asha** | 0.010 a | 0.004 | 0.004 | 0.003 |
| **L.S.D 0.05** | 0.005 | ns | ns | ns |
| **B) Org- biofertlize** | | | | |
| **Untreated** | 0.007 b | 0.004 | 0.003 | 0.015 |
| **Organic** | 0.008 ab | 0.008 | 0.001 | 0.005 |
| **Microbin** | 0.012 a | 0.006 | 0.003 | 0.005 |
| **Cerealine** | 0.009 ab | 0.003 | 0.003 | 0.003 |
| **Mycorrhizae** | 0.007 b | 0.004 | 0.003 | 0.001 |
| **Org. + Microbin** | 0.009 ab | 0.006 | 0.001 | 0.003 |
| **Org. + Cerealine** | 0.008 ab | 0.005 | 0.001 | 0.004 |
| **Org. + Mycorrhizae** | 0.012 a | 0.006 | 0.001 | 0.001 |
| **L.S.D 0.05** | 0.004 | ns | ns | ns |
| **Interaction** | | | | |
| **A × B** | ns | ns | ns | ns |

**Table: (7) Chlorophyll 'A+B' as affected by three cultivars and bio-organic fertilizers at three growth stages in 2008/2009 and 2009/2010 season.**

| Treatments | 2008/2009 season | | | 2009/2010 season | | |
|---|---|---|---|---|---|---|
| | 60 DAS | 75 DAS | 90 DAS | 60 DAS | 75 DAS | 90 DAS |
| **A) Cultivars** | | | | | | |
| **Giza 123** | 2.938 a | 2.668 a | 2.555 a | 2.958 a | 2.644 a | 1.409 a |
| **Aksad** | 1.912 b | 2.352 ab | 1.337 ab | 2.878 a | 2.358 ab | 1.204 ab |
| **Oroar- Asha** | 1.880 b | 2.208 b | 1.337 b | 1.906 b | 2.221 b | 1.122 b |
| **L.S.D 0.05** | 0.085 | 0.339 | 0.322 | 0.225 | 0.215 | 0.115 |
| **B) Org- biofertlize** | | | | | | |
| **Untreated** | 1.914 | 2.268 c | 1.535 | 1.704 | 2.247 c | 1.094 |
| **Organic** | 1.839 | 2.279 c | 1.094 | 1.903 | 2.324 c | 1.076 |
| **Microbin** | 1.654 | 2.361 b | 1.376 | 1.716 | 2.334 c | 1.196 |
| **Cerealine** | 1.822 | 2.386 b | 1.312 | 1.843 | 2.375 b | 1.037 |
| **Mycorrhizae** | 1.965 | 3.584 a | 1.196 | 1.974 | 2.675 a | 1.278 |
| **Org. + Microbin** | 2.096 | 2.542 ab | 1.165 | 2.131 | 2.537 a | 1.165 |
| **Org. + Cerealine** | 1.962 | 2.475 ab | 1.136 | 2.001 | 2.516 a | 1.195 |
| **Org. + Mycorrhizae** | 2.028 | 2.458 ab | 1.312 | 2.040 | 2.452 abc | 1.118 |
| **L.S.D 0.05** | ns | 0.210 | ns | ns | 0.229 | ns |
| **Interaction** | | | | | | |
| **A x B** | ns | ns | ns | ns | ns | ns |

**Table: (8) plant height (cm), Spike length (cm), number of grain/spike and number of spike/m$^2$ as affected by cultivars and bio-organic fertilizers in 2008/2009 and 2009/2010 season.**

| Treatments | Plant height at harvest time (cm) | | Spike length (cm) | | No. of grain/spike | | No. of spikes/m$^2$ | |
|---|---|---|---|---|---|---|---|---|
| | 2008/2009 | 2008/2009 | 2008/200 | 2008/2009 | 2008/2009 | 20008/2009 | 20008/2009 | 2008/2009 |
| A) Cultivars | | | | | | | | |
| Giza 123 | 95.92 ab | 93.25 ab | 17.29 a | 15.99 | 50.63 a | 50.54 | 435.64 a | 376.83 a |
| Aksad | 87.5 b | 85.50 b | 17.46 a | 16.00 | 49.36 a | 50.71 | 434.83 a | 365.50 ab |
| Oroar- Asha | 107.71 a | 101.71 a | 16.54 b | 15.77 | 29.17 b | 51.92 | 416.67 b | 347.66 b |
| L.S.D 0.05 | 17.39 | 10.87 | 0.55 | ns | 6.74 | ns | 12.18 | 14.33 |
| B) Org- biofertlize | | | | | | | | |
| Untreated | 99.78 | 85.00 c | 16.00 | 16.22 a | 36.89 b | 50.89 | 366.22 b | 357.78 |
| Organic | 97.11 | 100.67 a | 17.50 | 16.17 a | 44.11 ab | 52.22 | 444.00 a | 362.22 |
| Microbin | 96.56 | 99.33 abc | 18.11 | 16.24 a | 45.00 ab | 49.56 | 436.67 a | 346.67 |
| Cerealine | 101.89 | 99.78 ab | 17.44 | 15.78 ab | 41.22 b | 50.89 | 433.67 a | 368.89 |
| Mycorrhizae | 87.78 | 85.89 bc | 16.89 | 15.94 ab | 52.22 a | 50.67 | 434.82 a | 375.56 |
| Org. + Microbin | 95.11 | 93.44 abc | 17.56 | 14.94 b | 39.22 b | 52.89 | 440.22 a | 355.56 |
| Org. + Cerealine | 101.00 | 96.44 abc | 17.28 | 16.17 a | 41.22 b | 50.00 | 438.11 a | 366.67 |
| Org. + Mycorrhizae | 90.11 | 87.33 abc | 16.00 | 15.89 ab | 44.78 ab | 51.33 | 438.56 a | 373.33 |
| L.S.D 0.05 | ns | 12.44 | ns | 1.07 | 7.51 | ns | 12.75 | ns |
| Interaction | | | | | | | | |
| A × B | ns | ns | ns | ns | ns | ns | * | ns |

**Table: (9) 1000- grain weight (g), straw yield (t/fed), grain yied (ardab/fed) and crude protein percentage (%) as affected by cultivars and bio-organic fertilizers in 2008/2009 and 2009/2010 season.**

| Treatments | Plant height at harvest time (cm) | | Spike length (cm) | | No. of grain/spike | | No. of spikes/$m^2$ | |
|---|---|---|---|---|---|---|---|---|
| | 2008/2009 | 2008/2009 | 2008/200 | 2008/2009 | 2008/2009 | 20008/2009 | 20008/2009 | 2008/2009 |
| **A) Cultivars** | | | | | | | | |
| **Giza 123** | 55.39 a | 53.93 | 3.41 | 3.35 b | 14.76 b | 14.11 b | 9.77 | 9.03 |
| **Aksad** | 52.10 ab | 52.57 | 4.03 | 3.79 a | 15.63 a | 14.68 a | 10.16 | 9.81 |
| **Oroar- Asha** | 50.40 b | 51.55 | 3.21 | 3.12 c | 13.63 c | 13.21 c | 10.21 | 10.95 |
| **L.S.D 0.05** | 3.55 | ns | ns | 0.07 | 0.14 | 0.22 | ns | ns |
| **B) Org- biofertlize** | | | | | | | | |
| **Untreated** | 49.60 b | 56.59 | 2.55 f | 2.71 f | 9.11 c | 8.21 c | 10.16 | 7.78 e |
| **Organic** | 55.09 a | 54.37 | 3.44 d | 3.52 c | 15.08 b | 15.63 b | 10.23 | 9.35 c |
| **Microbin** | 52.14 ab | 52.03 | 3.73 c | 3.13 d | 14.13 d | 14.27 c | 10.18 | 10.65 b |
| **Cerealine** | 52.48 ab | 51.82 | 3.81 c | 2.94 c | 14.08 d | 13.77 d | 10.18 | 11.95 a |
| **Mycorrhizae** | 53.06 ab | 51.78 | 4.24 a | 4.27 a | 17.25 a | 16.22 a | 10.19 | 8.77 d |
| **Org. + Microbin** | 52.66 ab | 51.46 | 3.81 c | 3.48 c | 15.20 b | 14.33 c | 9.9 | 9.78 c |
| **Org. + Cerealine** | 53.58 ab | 52.09 | 3.25e | 3.19 d | 14.13 d | 13.87 d | 10.13 | 10.90 b |
| **Org. + Mycorrhizae** | 52.42 ab | 51.31 | 4.11 b | 4.04 | 14.58 c | 15.59 b | 10.12 | 10.28 b |
| **L.S.D 0.05** | 4.35 | ns | 0.12 | 0.08 | 0.30 | 0.20 | ns | 0.55 |
| **Interaction** | | | | | | | | |
| **A × B** | * | ns | ns | ns | ns | ns | ns | ns |

# الملخص العربى

## دراسة مقارنة للتسميد الحيوى والعضوى على بعض أصناف الشعير

**ابراهيم فتح الله رحاب ، فتحى ابراهيم رضوان ، محمد عبد الجواد نصار**

**و ابراهيم موسى فرج**

كلية زراعة سابا باشا – قسم الانتاج النباتى

أجريت تجربان حقليتان خلال الموسمين 2009/2008 و 2010/2009 بالمزرعة البحثية بكلية الزراعة (سابا باشا) جامعة الإسكندرية لدراسة ثلاثة أصناف (جيزة 123، أكساد، وروراشا) لمصادر التسميد العضوى والحيوى (بدون معاملة – سماد عضوى – ميكروبين – سيريالين – ميكوريزا – خليط سماد عضوى + ميكروبين – سماد عضوى + سيريالين – سماد عضوى + ميكوريزا) . كان التصميم المستخدم القطع المنشقة مرة واحدة مع 3 مكررات فى هذه الدراسة.

**وكانت أهم النتائج ما يلى:**

- لوحظ وجود إختلافات معنوية بين أصناف الشعير فى كلا الموسمين حيث أعطى الصنف أكساد يليه جيزة 123 أكبر محصول عن الصنف وروراشا فى محصول الحبوب والقش وكذلك جميع الصفات الأخرى.
- أوضحت النتائج أيضا أن جميع معاملات التسميد الحيوى والعضوى أدت إلى زيادة معنوية محصول الحبوب والمحصول ومكوناته وصفات الجودة بينما أعطى التلقيح بالميكوريزا أعلى محصول القش ومحصول الحبوب.